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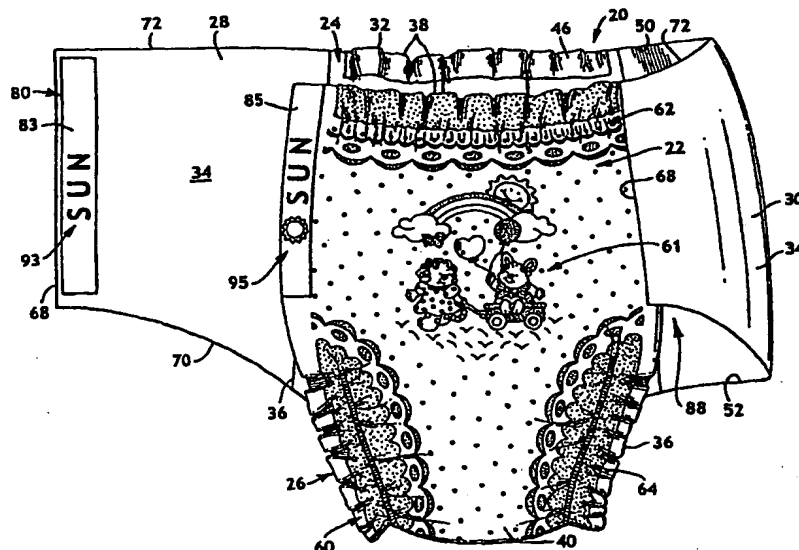
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(54) Title: **ABSORBENT ARTICLES INCLUDING HIDDEN GRAPHICS**



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## ABSORBENT ARTICLES INCLUDING HIDDEN GRAPHICS

Background of the Invention

The present invention relates to absorbent articles which are adapted to contain body exudates. More particularly, the invention pertains to pant-like disposable absorbent articles with refastenable seams and hidden graphics, packages of such disposable absorbent articles, and methods of making such disposable absorbent articles.

5       The age at which little boys and girls begin the toilet training process varies significantly. Some children may start the toilet training process as early as the age of fifteen months, while others may not be ready until after the age of two years. The age at which children begin this training process is dependent upon many factors, some of which are psychological, some physiological, and some unique to the individual child or their  
10       environment.

      The toilet training process embraces a number of aspects, not all of which apply to each child. One aspect of the total toilet training process is the change from diapers to training pants to help the child understand that he or she should now use the toilet just like grownups. Another aspect of the total toilet training process includes parental or caregiver  
15       instruction as a positive encouragement and reinforcement to the child that he or she should now be using a toilet instead of diapers. Although the use of training pants and positive encouragement from the parent or caregiver have been helpful in the toilet training process, there is still much room for improvement. Specifically, parents and caregivers are still searching for easier and quicker ways to guide their children  
20       successfully through the toilet training process.

      Many caregivers and parents have difficulty in determining the readiness of a child to begin the toilet training process, and underestimate the difficulty of teaching the toilet training process to young children. If a child does not respond to an initial toilet training instruction or introduction, the caregiver or parent can be at a loss for finding techniques,  
25       methods, or teaching tools to encourage the child to master the art of toilet training. Thus, while various teaching tools such as books, videotapes, charts with stickers, personalized toilets, and interactive toilet training kits are available, there remains a need for new and improved educational and motivational mechanisms to facilitate the toilet training process.

### Summary of the Invention

In response to the above-referenced unfulfilled need in the art, a new disposable absorbent article has been discovered. The absorbent article is in the form of a refastenable pant with hidden graphics. The fastening system of the pant can be repeatedly fastened, unfastened and refastened. When the fastening system is engaged, such as would be the case during use and when manufactured in a prefastened condition, the hidden graphics are not directly visible upon inspection of the inner and outer surfaces of the garment. Rather, the hidden graphics become visible only when the fasteners are disengaged from one another. The hidden graphics can be used by the caregiver or parent as a motivational and educational instrument to improve the speed and quality of the total toilet training process.

In one embodiment, the present invention pertains to an absorbent article including an absorbent chassis defining longitudinal and transverse axes, opposite inner and outer surfaces, first and second longitudinally spaced waist regions, and a crotch region which extends between and interconnects the waist regions. The first waist region defines a pair of transversely opposed side panels. The absorbent article also includes first and second fastening components disposed on the side panels, and at least one mating fastening component disposed in the second waist region. The fastening components are adapted to releasably engage the mating fastening component, thus forming an overlap region of the first and second waist regions. A graphic is disposed in the overlap region in the second waist region, separate from and transversely outward from the at least one mating fastening component, to define a hidden graphic.

In another embodiment, the present invention pertains to an absorbent article including an absorbent chassis with a pair of transversely opposed side panels in the first waist region. First and second fastening components are disposed on the side panels, and at least one mating fastening component is disposed in the second waist region. The fastening components releasably engage the mating fastening component to form an overlap region of the first and second waist regions. Additionally, a graphic is disposed in the overlap region and on the inner surface of one of the side panels to define a hidden graphic.

In this particular embodiment, the graphic can be disposed on one or both of the first and second fastening components, and/or disposed in close proximity to and transversely inward from one of the fastening components.

In a further embodiment, the present invention pertains to an absorbent article with a fastening system including first and second fastening components disposed in the first waist region and first and second mating fastening components disposed in the second waist region. At least one of the mating fastening components includes a freeform graphic. The first and second fastening components are substantially the same size or larger than the freeform graphic and substantially the same size or larger than the first and second mating fastening components. In this way, the freeform graphic forms a hidden graphic when the fastening components are centrally positioned relative to and engaged with the mating fastening components.

As used here, the term "freeform graphic" refers to all forms of graphics except those that form all or part of an array of identical or similar discrete graphic elements defining transversely oriented columns. Freeform graphics can comprise text messages and/or pictorial images, but as noted exclude position indicators in the form of transversely oriented graphic arrays. Such graphic arrays have been employed on disposable absorbent articles for use as position indicators for fastening tapes. Graphic arrays using identical graphic elements, similar-size graphic elements, and similar-shaped graphic elements as position indicators are disclosed in U.S. Patent 4,662,875 issued May 5, 1987 to Hirotsu et al.; U.S. Patent 5,133,707 issued July 28, 1992 to Rogers et al.; and U.S. Patent 5,275,588 issued January 4, 1994 to Matsumoto et al.

In a still further embodiment, the present invention pertains to an absorbent article with a fastening system including first and second fastening components disposed on the inner surface in the back waist region and first and second mating fastening components disposed on the outer surface in the front waist region. Each of the mating fastening components has a length dimension that is equal to or greater than a width dimension. At least one of the mating fastening components includes a freeform graphic that forms a hidden graphic when the fastening components are engaged with the mating fastening components.

In yet another embodiment, the present invention pertains to an absorbent article defining a longitudinal axis, a transverse axis, front and back longitudinally spaced waist regions, and a crotch region which extends between and interconnects the waist regions. The absorbent article includes an absorbent chassis and front and back elastic side panels extending transversely outward from the absorbent chassis in the front and back waist regions. A mechanical fastening system includes first and second fastening

components disposed on the front elastic side panels and first and second mating fastening components disposed on the back elastic side panels. A graphic is located on at least one of the fastening components or the mating fastening components and forms a hidden graphic when the fastening components are engaged with the mating fastening components.

The fastening components and the mating fastening components form refastenable seams for securing the first and second waist regions together. The refastenable seams allow the product to be either pulled on like a pant or applied like a diaper. If the training pant becomes soiled during use, the first and second fastening components can be disengaged from the first and second mating fastening components to easily remove the training pant from the waist of the wearer with reduced risk of undesirably soiling the clothes or legs of the wearer. Further, the fastening components can also be easily disengaged to inspect the training pant for possible soiling. Thus, the training pant is configured to be pulled on or off over the hips of the wearer such as conventional training pants and can be readily applied or removed by disengaging the fasteners similar to conventional diapers. Moreover, the fastening components can be repositioned if necessary after the training pant has been pulled on over the legs and hips of the wearer.

The hidden graphics can provide a motivational and educational mechanism for the caregiver or parent to use to improve the speed and quality of the toilet training process. The hidden graphics can comprise text messages consisting of alphanumeric symbols, pictorial images consisting of pictures, or both text messages and pictorial images. In particular embodiments, the hidden graphics can be formed by graphics disposed on the fastening components and/or the mating fastening components. Alternatively, the hidden graphics can be formed by graphics disposed on other components of the absorbent article, such as the outer cover, the bodyside liner, side panels, or the like, and on either the inner surface or the outer surface of the absorbent article. In either case, the hidden graphics do not become visible to the child or caregiver until the fastening components are disengaged to expose the facing surfaces of the absorbent article in the overlapping regions. The hidden graphics, when they become visible, can provide opportunities for positive interaction to make the toilet training process more enjoyable for the child and caregiver. The hidden graphics can provide educational opportunities as well.

In certain embodiments, two or more graphics on the absorbent article can be related in subject matter. As used herein, the phrases "subject matter relationship" and "related in subject matter" refer to the situation where the subject matter of one graphic is

the same as or is linked to the subject matter of another graphic. The subject matter relationship can be between two or more text messages, between two or more pictorial images, or between a combination of one or more text messages and one or more pictorial images. By way of example, two text messages are considered related in subject matter where the messages: are identical; jointly form a sentence, thought, or action such as "attach" and "here"; each refer to one and the other of two items that are commonly associated with one another, such as "bat" and "ball," "Big" and "Kid," "Big" and "Girl," or "Big" and "Boy"; jointly present a question and answer; or the like. Similarly, two pictorial images are considered related in subject matter where the images are identical; separately illustrate different sizes, shapes, colors of a common object; each illustrate one and the other of two objects that are commonly associated with one another, such as the moon and stars; jointly illustrate geometrically mating or engaging elements such as a triangle and a triangularly-shaped aperture, or two halves of a zipper; each illustrate one part of a multipart picture; or the like. Likewise, a text message and a pictorial image are considered to have a subject matter relationship where the text names, defines or describes the image; or the like.

To facilitate fastening and refastening of the fastening system, the fastening components of the absorbent article can comprise text messages or pictorial images that indicate where to attach the fasteners. Moreover, the first and second fastening components and the first and second mating fastening components can each comprise text messages or pictorial images that indicate where to attach the fastening components and the mating fastening components. In one embodiment, for instance, the first and second fastening components and the first and second mating fastening components each comprise an identical pictorial image that denotes proper attachment zones.

In particular embodiments, the absorbent article can include both hidden graphics and outer cover graphics, which can but need not necessarily be related in subject matter. In one embodiment, for instance, an absorbent article defines longitudinal and transverse axes, first and second longitudinally spaced waist regions, and a crotch region which extends between and interconnects the first and second waist regions. The absorbent article includes an absorbent chassis with an outer cover and an outer cover graphic. First and second fastening components comprising mechanical fastening elements are disposed in the first waist region, and at least one mating fastening component is bonded to the outer cover in the second waist region. The mating fastening component is formed of mechanical fastening elements that are adapted to releasably engage the fastening components. In one embodiment, at least one of the fastening components or the at least

one mating fastening component include a graphic defining a hidden graphic. As noted, the outer cover graphic can be related in subject matter to the hidden graphic.

Outer cover graphics are directly visible on the exterior surface of the absorbent article and have been extremely appealing to children. Moreover, parents and caregivers  
5 can use outer cover graphics as educational and motivational tools to advance the toilet training process. By relating the hidden graphic to the outer cover graphic, many new educational and motivational opportunities are available to enhance the toilet training process. The outer cover graphic typically comprises a pictorial image, and the hidden graphic may comprise either a text message or a pictorial image. Optionally, the outer  
10 cover graphic and the hidden graphic may comprise separate parts of a complete pictorial image that is only revealed by disengaging the fastening components.

The refastenable seams are formed when the first and second fastening components are engaged with at least one mating fastening component, which may comprise first and second mating fastening components. As used herein, the term  
15 refastenable seam is limited to those portions of the fastening components that releasably engage one another. Thus, finger tab portions, anchoring portions, other materials that do not releasably fasten together, and other non-fastening portions of the first and second fastening components and first and second mating fastening components do not constitute part of the refastenable seam.

20 The refastenable seams are desirably relatively thin, narrow and flexible to afford the look and feel of a cloth garment. Thus, in particular embodiments, the refastenable seams have a length-to-width ratio of about 2 or greater, such as about 2 to about 25, particularly about 5 or greater, such as about 5 to about 8. The refastenable seams define a length dimension and a width dimension that is perpendicular to the length dimension.  
25 For a child of about 9 to about 15 kilograms (20-34 lbs.), for example, the length dimension is desirably from about 5 to about 13 centimeters, such as about 10 centimeters, and the width dimension is desirably from about 0.5 to about 3 centimeters, such as about 2 centimeters. Desirably although not necessarily, the length dimension can be aligned generally parallel to the longitudinal axis of the absorbent article and the  
30 width dimension can be aligned generally parallel to the transverse axis of the absorbent article. The term "generally parallel" as used herein refers to an angle within about 35 degrees or less of the referenced axis, and more particularly within about 20 degrees or less of the referenced axis.

The fastening components can comprise any refastenable fasteners suitable for  
35 absorbent articles, although desirably comprise mechanical fastening elements rather than adhesive fastening elements for improved performance. Suitable mechanical



fastening elements may be provided by interlocking geometric shaped materials, such as hooks, loops, bulbs, mushrooms, arrowheads, balls on stems, male and female mating components, buckles, snaps, or the like. In particular embodiments, the fastening components and mating fastening components comprise hook-and-loop fastening elements. One skilled in the art will recognize that the shape, density and polymer composition of the hooks and loops may be selected to obtain the desired level of securement between the fastening components and the mating fastening components. A more aggressive hook material may comprise a material with a greater average hook height, a greater percentage of directionally-aligned hooks, or a more aggressive hook shape.

As disclosed in copending U.S. Patent Application Serial No. 60/112,709, filed on December 18, 1998 by C. P. Olson et al. and titled "Absorbent Articles Having Differential Strength Refastenable Seam," the refastenable seam may include one or more main refastenable attachment zones and one or more enhanced refastenable attachment zones. The main and enhanced refastenable attachment zones may be constructed to provide differential levels of securement, and particularly augmented levels of securement at locations which are subject to greater levels of separation forces.

As disclosed in copending U.S. Patent Application Serial No. 60/112,775, filed on December 18, 1998 by C. P. Olson and titled "Absorbent Articles Having Hinged Fasteners," the refastenable seam may comprise individual fastening materials with narrow spacings therebetween. The narrow spacings provide a desirable hinge to improve fit and securement of the fastening components.

The disclosed absorbent articles are adapted to be worn adjacent to the body of a wearer to absorb and contain various exudates discharged from the body. The absorbent articles are desirably pre-fastened during manufacture to provide a pant-like product for the user. The product can then be pulled on like a conventional training pant, and subsequently checked or removed with the ease of a diaper-like product. Moreover, the product may be applied like a diaper rather than like a pant. Supplemental releasable fastening means such as frangible point bonds may be employed to maintain the absorbent article in a pant configuration until the user intentionally disengages the fasteners.

The fastening system allows for easy inspection of the interior of the pant-like product. If necessary, the fastening system also allows the pant to be removed quickly and easily. This is particularly beneficial when the pant contains messy excrement. If desired, the caregiver can completely remove the pant-like product and replace it with a new one without having to remove the child's shoes and clothing. The present fastening